

Education in the Anthropocene: Disinformation and power relations on environmental education

Ursula Maruyama

Business Administration Department

CEFET/RJ

Rio de Janeiro, Brazil

maruyama.academic@hotmail.com, ursula.maruyama@cefet-rj.br

Liz-Rejane Issberner

Postgraduate Program in Information Science

PPGCI, IBICT/UFRJ

Rio de Janeiro, Brazil

liris@gmail.com

Wladmir Henriques Motta

Production Engineering Department/DIPPG

CEFET/RJ

Rio de Janeiro, Brazil

mottaw@gmail.com, wladmir.motta@cefet-rj.br

Marcelo Sampaio Dias Maciel

Business Administration Department

CEFET/RJ

Rio de Janeiro, Brazil

msdmaciel@gmail.com, marcelo.maciel@cefet-rj.br

Abstract

The change in the use of natural resources on our planet is a most urgent topic to be addressed in the environmental agendas of all governments and discussed by civil society and the academic community. As consequence of this period known as Anthropocene, global warming is one of the most critical issues on the environmental agenda in the 21st century as it affects biogeochemical cycles and planetary biodiversity. In terms of sustainability, higher education can introduce new trends in the domains of education, research, and extension. However, understanding the Environmental Agenda requires a more careful analysis of information, stakeholder dynamics, public management and conflict of interest. How to counter desinformation about environmental education in HEIs (Higher Education Institutions)? This qualitative research based on the Federal Network of Professional Scientific and Technological Teaching (RFEPCT) seeks, through the proposal of a digital platform, to present a means of greening education.

Keywords

Environmental education, HEI, Desinformation, Information Science and Anthropocene.

1. Introduction

On the premise that 'a society based on a growth economy is not desirable, not sustainable, not viable, not durable', since we are already consuming more than the planet can offer us and it took billions of years to build. By nature, today emerges an environmental ethic that proposes the revaluation of life and the human being.

Even with millions of people without access to the consumption of products and services essential for a decent life, we are already consuming 50% more than the planet can replace and we need to reduce greenhouse gas emissions by 40% so that the planet's temperature does not rise above 2°C, a limit indicated by scientists to avoid major climate disasters (IPCC, 2014). However, as Lima (1997, 2011) warns, the “sustainability debate has already been established in an unsustainable society”.

The challenges in Brazil for a change in institutional and governmental behavior are many, since environmental issues have been considered obstacles to the political and economic projects of power-holding segments of society (Léna & Issberner, 2018). According to José Eli da Veiga (2007), the process of adopting the social and environmental term has nothing of chance or chance. Responds to an objective need. That is, a need for understanding the world as an organism, in a systemic, broad, interactive and complex way, inscribed in a need for survival, triggered by the environmental problems in which we are all inserted.

In addition to the inclusion of environmental issues in HEIs (Higher Education Institutions), there is also the challenge of environmental management in Higher Education Institutions, especially in public institutions in Brazil. Among the challenges encountered in the creation, implementation and consolidation of a university habitus focused on education in the Anthropocene, the following question arises: How to counter desinformation about environmental education in HEIs?

2. Anthropocene Warning

The term Anthropocene was coined to take into account the impact of the accelerated accumulation of greenhouse gases on climate and biodiversity, as well as the irreversible damage caused by excessive consumption of natural resources.

However, must it be transformed into a new geological epoch? As the debate continues between scientists, they still need solutions can be found. We are, in fact, witnessing a collective form of denial that is the result of a faith naive in progress, a consumerist ideology and powerful economic lobbies (Issberner and Lena, 2018).

What are the signs and challenges of the Anthropocene? How can we identify the key factors affecting society as a whole that need to be addressed urgently and immediately? The following sections intend to introduce this theme from scientific perspective.

2.1 Extrapolating Earth's Boundaries

Planet Earth is experiencing a period of ecological imbalances of such magnitude that ultimately threatens life on Earth. The intense use of natural resources on our planet and the exacerbated level of greenhouse gas (GHG) emissions are urgent topics to be addressed in the agendas of all governments and organizations, nationally and internationally. With the advancement of global warming, ecosystems and climate are increasingly affected even with the increase in the extinction rate of animal and plant species, whose consequences and risks are still unpredictable (PECI et al., 2017).

The Planetary Boundaries: Guiding Human Development Study on a Changing Planet by Steffen et al. (2015), indicates the need for a new paradigm that integrates the continuity of society's development and the maintenance of the Earth system (ES) in a state of resilience and accommodation. Planetary boundary (PB) promotes a scientific analysis of the risk that human disturbances will destabilize the ES on a planetary scale, with the updated and reinforced scientific basis of PB.

The planetary boundary model of Steffen et al. (2015) is based on an assessment of the level of human interference that could endanger the stability of this geological age on Earth. Of the nine borders identified in this paper, at least four have been surpassed: (i) climate; (ii) biosphere integrity; (iii) land use deforestation through deforestation; (iv) biogeochemical fluxes (in particular carbon).

2.2 The good, the bad, and the ugly: social perspective of the ecological crisis

By generalizing or globalizing dirt, thus erasing the boundaries that give access or interrupt the act of soiling, that is, of appropriating, property rights suddenly reach an unbearable, perfectly impossible level in life. Thus, Serres (2011) presents his view on 'The natural contract', which denounces, in its preamble, the Cartesian order, an aggressive and leonine act of appropriation; no longer imposing as masters and masters of nature.

Global climate change is one of the permanent axes of the 21st century agenda. According to Giddens (2007), climate change and the accompanying risks result from our intervention in the environment: they are not mere natural phenomena. Regarding biodiversity, Veiga (2010) points out that there is a serious confusion between the ideas of planet and biosphere, an important distinction, in a more delicate and fragile set of ecosystems, depending on its countless life forms. Thus, it is understood that what is in the spotlight is not the salvation of the planet or the biosphere, but the shortening of the shelf life of living beings.

Environmental demands raise the question of the democratic participation of society in harnessing and managing current and potential resources; They also generate a more plural decision-making process in choosing new lifestyles and building possible futures under the principles of ecological sustainability, regional balance, ethnic diversity, cultural autonomy, political independence and social equity, positioning culture. in a process of resignification of the current world (Leff, 2009).

For Bauman (2010), the environmental crisis came to question the conceptual foundations that boosted and legitimized economic growth, denying nature. Production continues to be guided and dominated by market logic. Sustainability discourse and policies are opening a heterogeneous field of alternative perspectives, marked by the conflict of interest surrounding the appropriation of nature.

2.3 Consumerism and environmental degradation

'Programmed obsolescence' is one of the main strategies of consumerism, consisting and purposefully shortening the shelf life of products. In ever shorter timeframes, appliances and equipment, from light bulbs to spectacle pairs, fail due to the intentional failure of an element unable to find a replacement part or repairer.

Consumer in a consumer society is a markedly different creature from the consumers of any other society to date, which, as advocated by Lipovetsky (2007), introduces a homo consumericus, maladjusted, unstable and flexible turbo-consumer, largely freed from ancient cultures. unpredictable in their tastes and shopping. What is most worrying, according to Lipovetsky, is that if previously consumer behavior was attributed to a particular niche market now "the taste for incessant change in consumption no longer has a social limit, it has spread to all layers and all (op.cit, p.43), going at a deeper level of the perception of being, "consumption is increasingly in charge of an identity function" (op. cit., p.45).

Questioning the growth society implies questioning capitalism, but the reverse is not necessarily true. More or less liberal capitalism and productivist socialism are two variants of the same growth society project, based on the development of the productive forces that supposedly favored the march of humanity towards progress (Latouche, 2009).

Consumerism promotes unproductive status competition and has detrimental psychological and social impacts on people's lives. It is therefore considered important to highlight the means by which the culture of consumerism is transmitted: institutions, media, social norms, and a series of subtle and not so subtle signals that encourage people to express themselves, seek identity and seek meaning through of material goods. The dismantling of these complex incentive structures requires systematic attention to the numerous ways in which they are built.

3. Desinformation

Proctor (2008) argues that we need to think about the conscious, unconscious and structural production of ignorance, its various causes and conformations, caused by neglect, forgetfulness, myopia, extinction, secrecy or suppression. The research by Lewandowsky et al. (2012) and Metzger & Flanagan (2013) reveal that the heavy use of social media

we take for granted today, people used a set of key heuristics, or mental shortcuts, when assessing the credibility of a source or message:

1. Reputation: Based on recognition and familiarity
2. Endorsement: If others find it credible
3. Consistency: If the message is echoed by multiple sites.
4. Expectation Violation: If a site looks and behaves as expected
5. Self-Confirmation: If a Message Confirms a Person's Beliefs
6. Persuasive Intent: The Source Intent When Creating the Message

Ignorance, like knowledge, has a political geography, which leads us to ask: who doesn't know? And why not? Where there is ignorance and why? Crucial is also (Wardle, 2017): ignorance for whom? And against whom? Ignorance has a history and is always unevenly distributed, the geography of ignorance has mountains and valleys. Who is ignorant and why and to what extent? What keeps ignorance in one place while evaporating somewhere else? And which of our countless ignorances will be tolerated or fought?

3.1 Desinformation on ecological issues

Society generally has difficulty in obtaining reliable information on environmental protection policies, as they are organized and controlled; while not realizing the impacts that consumer behavior can have on the planet's biodiversity. What are the tools or ways to generate this 'state of ignorance' in society? How information can be 'manipulated' or 'constructed' to create a 'more sustainable' reality from an economic point of view, and 'masked' from an environmental point of view. In order to multiply the results that Information Science can contribute to the education of young people in HEI, it is proposed to observe what are the perspectives discussed about the typology of misleading information and its difference with the concept of misinformation.

4. Greening education

Paulson (2015) argues that by locating environmental phenomena at the crossroads of multiple power relations, political ecologists have expanded the scale of environmental analysis to transcend geographical localities and local populations. Jacobi and Maia (2016) present the discussion on how to overcome the obstacles that affect the connection between science and politics, emphasizing the triggering and mobilizing factors. The socio-environmental framework that characterizes contemporary societies shows that the human impact on the environment is causing increasingly complex changes, both quantitatively and qualitatively. In this regard, the issue of sustainability has taken a leading role in relation to the apparent dimensions of development and alternatives.

4.1 Federal Network of Professional, Scientific and Technological Education

The history of Federal Network of Professional, Scientific and Technological Education (RFEPCT) began in 1909, when the then President of the Republic, Nilo Peçanha, created 19 schools of apprentices and craftsmen that later gave rise to the Federal Centers for Vocational Education and Technological (Cefets). Covering the entire national territory, the Federal Network provides a service to the nation, continuing its mission of qualifying professionals for the various sectors of the Brazilian economy, conducting research and developing new processes, products and services in collaboration with the productive sector.

On December 29, 2008, through Law No. 11,892, 31 federal technological education centers (Cefets), 75 decentralized teaching units (Uneds), 39 agricultural schools, 7 federal technical schools and 8 university-related schools ceased to exist. to form the Federal Institutes of Education, Science and Technology. Currently, under the federal education system, the Federal Network of Vocational, Scientific and Technological Education, linked to the Ministry of Education, consists of the following institutions:

- Federal Institutes of Education, Science and Technology
- Federal Centers for Technological Education
- Technical Schools Linked to Federal Universities
- Federal Technological University of Paraná
- Pedro II College

In order to identify the educational initiatives of the institutions that make up the RFEPCT, the institutional websites of all members were analyzed, as well as videos made available through the YouTube platform. Twenty-six initiatives from these institutions were selected to compose the digital collection of environmental awareness, as follows:

Table 1. RFEPCT environmental projects' video recording

HEI	time	Content description
CEFET-RJ	5'45"	Rio Development Forum (ALERJ) organized in partnership with CEFET-RJ, "Zero Waste inside and outside home" event (October 26th,2018) http://www.youtube.com/watch?v=xuM8BKQIBpg
IFG	10'50"	GreenIFG – Environmental Action - IFG 2017 https://www.youtube.com/watch?v=D4-2-5C91eI
IFAP	4'03"	Container Home Professor Pedro Aquino Instituto Federal do Amapá 2018 http://www.youtube.com/watch?v=s2fjJB8GhA8
IFSULDEMI NAS	8'55"	IFSULDEMINAS – Institucional video track – 2017 http://www.youtube.com/watch?v=AkOuskWkm-U
IFSULDEMI NAS	6'32"	Mantiqueira Maintenance Program - Forest restoration training IFSULDEMINAS 2018 http://www.youtube.com/watch?v=cklw8oIhGr4
IFB	4'58"	Sustainable IFB - TV IFB (March 28,2018) http://www.youtube.com/watch?v=AqKopmnbV1o
IFMT	9'42"	Sustainability IFMT BLV (2014) – short movie made by IFMT students http://www.youtube.com/watch?v=J3bQxa3PeOg
IFAC	3'55"	Ifac Environment Project in Várzea neighborhood - TV Juruá (September 11, 2015) http://www.youtube.com/watch?v=xQoC-s0_Y0g
IFAL	3'15"	Ifal students develop project to use renewable energy for irrigation - Alagoas Rural Program (2016) http://www.youtube.com/watch?v=-TSLSZ1cZVs
IFBA	13'32"	IFBA institutional video: Licuri Project, fruit from Bahia semiarid region. (2014) http://www.youtube.com/watch?v=AeJLEPkqvWk
IFCE	11'13"	Project develops irrigation system to improve farmer production (TV Diário) Enactus IFCE 2016 http://www.youtube.com/watch?v=HPbuawEJF4
IFMA	2'25"	TV DIFUSORA SUL - Bricks – cement and soil IFMA (2017). http://www.youtube.com/watch?v=0tnEzwiEINs
IFAC	22'58"	This video aims to introduce the natural organic insecticide against sigatoka (black and others) that has no impact on the environment. IFAC (2015). http://www.youtube.com/watch?v=ppQwqWOM4pY
IFPA	14'09"	IFPA Environment Week has Innovative Projects - SBT Bragança (June 07, 2016) http://www.youtube.com/watch?v=h2yGSa4-00A
IFAL	4'24"	Sustainable Soaps: How IFAL Students Are Preserving The French Beach (TV Gazeta/Bom dia AL 2017) http://www.youtube.com/watch?v=iIpdXhVFFNo
IFPI	4'01"	Student project installs solar panels in IFPI classrooms (2019) http://www.youtube.com/watch?v=ZyOe0Oz_GqQ
IFB	16'48"	I Academic Conference PROEJA (November 22, 2018) Sustainable Radio Station IFB http://www.youtube.com/watch?v=0Bn2VVWPPlw
CEFET-RJ	1'15"	Iara é um projeto que busca, através de tecnologias sociais, minimizar os efeitos das más condições sanitárias nas comunidades do Rio de Janeiro. Enactus CEFET/RJ (2018) http://www.youtube.com/watch?v=AtBO_KVhw
IFBA	4'57"	SUSTENTABILIDADE (sustainability) – short movie (IFBA Campus Ilhéus ITI-31 2017) http://www.youtube.com/watch?v=hkZQ2r9cZmg

IFAL	2'09"	Bom dia Brasil (2018): Ifal Maceió Electrotechnical students have developed sustainable battery "chargers" allowing tourists and residents of Maceió charge their cell phones and speakers using solar energy. http://www.youtube.com/watch?v=IYTI-psFFyQ
IFRN	3'59"	Sustainable IFRN – recycling program em 2013. http://www.youtube.com/watch?v=J0hkVpG0-SI
CEFET-MG	2'51"	FEBRACE 2016 "Characterization and Application of Steel Powder in Environmental Remediation" CEFET-MG project in 2016 http://www.youtube.com/watch?v=jD0iZNPzsT4
IFAM	3'16"	Band AM: IFAM students project uses water to generate energy in communities in the interior of Amazonas (2014) http://www.youtube.com/watch?v=l4r-se2IgTc
IFSP	59"	IFSP campus Suzano (2018) Ginger and Juá Sustainable Shampoo http://www.youtube.com/watch?v=b4NpXJn4r6g
IFS	12'27"	Project of the Environment Week 2018 carried out by the 1st year of informatics class Instituto Federal de Sergipe (IFS) Campus Aracaju. http://www.youtube.com/watch?v=8zpZR2c9eLI
CEFET-MG	2'58"	Concentrated Photovoltaic Energy (CPV) project developed at CEFET-MG is presented in this video as part of Inova Minas 2017, promoted by FAPEMIG. http://www.youtube.com/watch?v=r0BZ31WxQIU

These videos compose a set of information, organized as a digital repository model that seeks to integrate an information network through hyperlinks with other digital platforms such as Ibict's Brazilian Digital Library of Theses and Dissertations and other websites of international organizations, facilitating students, researchers and citizens, access to reliable sources of information on greening education.

5. Anthropocene Education website

Elaborated as a contribution to RFEPCT, this pilot project aims at integrating a set of institutional initiatives based on documents, practices, news and informational actions and was consolidated in the construction of a digital platform (designed and implemented by the authors between February and March 2019), consolidating the main data sources used throughout the development of this research and organized electronically.

The proposal of this research can be accessed through the email address: <https://www.educacaonoantropoceno.com/> and it mainly deploys:

- (i) Home Page;
- (ii) About - Information about authors; Misinformation; Information regime; RFEPCT Research;
- (iii) Anthropocene Education: Ecological crisis; Greening Education; Environmental legislation; Environmental governance; and. Circular Economy; Anthropocene Video Library;
- (iv) RFEPCT - Brief presentation of the Federal Network of Professional, Scientific and Technological Education (RFEPCT) with space dedicated to each institution stratified by region, indication and contact (in case of existence of sustainability committee), hyperlink to the institution's website and Research Gate of each registered institution.
- (v) Best Practices - Summary of RFEPCT Best Practices with photos and direct hyperlink to each of the related topics: RFEPCT Documents; Conif News; RFEPCT Scientific Production; Recommended Publications; Selection of 45 theses and dissertations on environmental sustainability in RFEPCT; hyperlink to Ibict's Brazilian Digital Library of Theses and Dissertations (BDTD); Video library
- (vi) Actors - Hyperlink to Federal Government agencies, National and International Sustainability Periodicals, in addition to those stratified by area, such as: Environment (INMA, IBAMA, ICMBIO, TAMAR PROJECT, A3P, Terracycle, Greenpeace, WWF); Certification (INMETRO, ABNT, ISO, FSC, Green Metric UI, IBD, IMO, IMA, SCS, ICS, ECOCERT, AAO, Ecological Center); Human Rights (United Nations, ONUBR, WFP, FAO, ILO, ILO); Economy (IMF, World Bank, World Economic Forum, WTO, ECLAC, CAF, UNITED, BACEN, BNDES); Education (UNESCO, UNICEF, INEP, CAPES, FGV, CONIF, ANDIFES, ENACTUS); Energy (IAEA, IEA, CNEN, ANEEL, ONS, Eletrobras, Petrobras); Information & Articulation (UNDP, UM Environment, UM Global Compact, UNCTAD,

- OECD, GRI, Transparency International, Global LCA, CGEE, IBICT); Innovation & Technology (WIPO, INPI, INT, CTI Renato Archer, Embrapii); Research (NASA, WMO, IPCC, INCT, INPE, ON, CBPF, LNCC, CNPq, IBGE, IPEA, CETEM, EPE, CEPEL, M.GOELDI, INSA, INPA, INDS Mamirauá, CETENE, CONCEA); Health & Safety: WHO, CTN BIO, FIOCRUZ, REDEFIT, CEMADEN;
- (vii) Contact - Area intended for direct contact with researchers.



Figure 1. Anthropocene education website

It is noteworthy that the consolidation of information in a digital platform is only enlightening, in order to provide "the first steps", and not exhaustive, about environmental information to researchers. The integration of international networks and organizations aims to facilitate contact from different sources from a common origin. However, it recognizes that it should have its basis compared to other forms of research for continuous enrichment of this work.

6. Conclusions

As consequence of this recently called Anthropocene period, climate change is one of the most significant axes of the environmental agenda in the 21st century, as it affects biogeochemical cycles and planetary biodiversity. However, it should not be forgotten that we are embedded in a consumer society that promotes, encourages or reinforces the choice of a consumerist lifestyle and existential strategy, and rejects all alternative cultural options.

Questioning the growth society implies questioning capitalism, the current planetary crisis elicits different responses in individuals, groups and governments, ranging from denial, misunderstanding and indifference to a yearning for engagement and activism. At first glance, it seems impossible to build 'sustainable development' without an education for greening. Regarding the educational, scientific and academic field, this context requires commitment to the search for technical and political-economic solutions that meet the material and symbolic needs that structure contemporary society, without ignoring the conflicts of interest in this and its contradictions.

The relationship between environment and citizenship education takes on an increasingly challenging role, demanding the emergence of new knowledge to grasp social processes that are becoming more complex every day. At this point, there needs to be an educational process capable of positioning itself politically and conducting a critical analysis of the various social and environmental projects that dispute social and political-pedagogical goals.

As an informational artifact for the integration and interaction of these relations, being one of the contributions of this thesis, a pilot project was elaborated through the creation of a digital platform that, besides bringing the main concepts raised by the research, offers a series of other resources (such as for example, films, lectures, debates and research projects) that can be shared among researchers on ecological issues, their collaborating partners, including any citizen interested in researching the topic.

Through the organization of the digital platform, the objective is to clarify the concept of Disinformation, Information Regime and, above all, to offer material for other research, discussion groups and work that develop projects focused on Education in the Anthropocene, which may benefit from the CTS (Science-Technology-Society) approach to foster the dissemination of a culture focused on institutional environmental sustainability, since CTSA (Science-Technology-Society-Environment) education proposes new references of knowledge and practices integrating technology with content, promoting the awareness of the student so that one builds a new awareness about the environmental impacts.

Acknowledgements

RFEPECT managers and Conif FDI committee for allowing to investigate their data and interview their members.

References

- Bauman, Z. *Capitalismo parasitário: e outros temas contemporâneos*. Rio de Janeiro: Zahar, 2010.
- Giddens, A. *Mundo em descontrolo*. 3 ed. Rio de Janeiro: Record, 2007.
- Issberner, L-R; Lená, P. Anthropocene: the vital challenges of a scientific debate In: *The Unesco Currier*, Abril/June 2018.
- Jacobi, P.; Maia, R. Challenges and strategies to strengthen relationship between science and politics regarding climate change. *Ambiente & Sociedade*. v.XIX, n.4, p.235-248, 2016.
- Latouche, S. *Pequeno tratado do decrescimento sereno*. São Paulo: Martins Fontes, 2009.
- Leff, E. *Ecologia, capital e cultura: a territorialização da racionalidade ambiental*. Petrópolis, RJ: Vozes, 2009.
- Léna, P.; Issberner, L. Desafios para o Brasil em Tempos de Antropoceno. In: MAY, H. Peter. (Org.). *Economia do meio ambiente: Teoria e prática*. 3a.ed. Rio de Janeiro: Elsevier, 2018, p. 205-230.
- Lewandowsky, S. et al. Misinformation and Its Correction: Continued Influence and Successful Debiasing, *Psychological Science in the Public Interest*, v.13, n.3, pp. p.106–131, 2012.
- Lipovetsky, G. *A felicidade paradoxal: ensaio sobre a sociedade de hiperconsumo*. São Paulo: Cia das Letras, 2007.
- Maruyama, U. et al. Nurturing the Seeds of Sustainability Governance: Rio+25 Brazilian Higher Education Institution Case Study. In: *4th World Symposium on Sustainable Development at Universities, 2018, Penang. Following-up the UN Conference on Sustainable Development (Rio+20)*, 2018. v. 1.
- Maruyama, U. Filtro invisível ou miopia informacional? Reflexões acerca das ferramentas de busca na internet sob a perspectiva do Marketing e da Ciência da Informação. In: *XII CONGRESSO NACIONAL DE EXCELÊNCIA EM GESTÃO & III INOVARSE, 2016, Rio de Janeiro. Transformação Organizacional para a Sustentabilidade*, 2016.
- Metzger, M.; Flanagin, A.J. Credibility and trust of information in online environments: The use of cognitive heuristics. *Journal of Pragmatics*, n.59, p. 210-220, 2013.
- Paulson, S. *Political ecology*. In: D'ALISA, G. et al. *Degrowth: a vocabulary of a new era*. New York: Routledge, 2015.
- Peci, G. et al., Biodiversity redistribution under climate change: Impacts on ecosystems and human well-being. *Science*, v.355, n.1389, Mar. 2017.
- Proctor, R.; Schiebinger, L. *Agnology: the making and unmaking of ignorance*. Palo Alto, CA: Stanford University, 2008.

Serres, M. O mal limpo: poluir para se apropriar? Rio de Janeiro: Bertrand Brasil, 2011.

Steffen, W. et al. Planetary boundaries: Guiding human development on a changing planet. *Nature*, v. 347 n.6223, p. 736-747, Feb. 2015.

Veiga, J.E. Sustentabilidade: a legitimação de um novo valor. São Paulo: editora Senac, 2010.

Wardle, C.; Derakhshan, H. Information Disorder: Toward an interdisciplinary framework for research and policymaking. Council of Europe Report DGI, 2017.

Biographies

Ursula Maruyama is Business Administration Department Professor since 2011. Information Science PhD (PPGCI-IBICT/UFRJ). Science, Technology and Education MSc. with emphasis in technology education innovation. Before starting her academic career, she had lived overseas for two years through an interchange program in Washington DC, USA. She worked for 12 years at international private companies such as Groupe Schneider, Asea Brown Boveri, Lanxess, Royal Dutch Shell and Praxair Inc., as well as in public companies as CEPEL (Eletrobras Electric Research & Certification Center) and BBTS (Brazilian Bank Technology and Services) in Maintenance Programming, Logistics, Supply Chain Management, Productivity – Six Sigma, Internal Controlling/Compliance. Other certifications: Project Management MBA, Human Resources Specialization, Public Management MBA. Other relevant projects: Management consultant and research at RNP (National Network of Education and Research) in projects with sponsors such as Brazilian Communications Ministry, Brazilian Education Ministry, Brazilian Health Ministry. Cefet/RJ's Chief Strategic Officer (2016-2019).

Liz-Rejane Issberner. Senior Researcher at the Brazilian Institute of Science and Technology Information (IBICT). Professor of the Graduate Program in Information Science, under the IBICT/UFRJ. Postdoctoral fellow at the Institut de Recherche pour le Développement (IRD-Paris) in the CAPES Senior Internship Program. Doctorate and Master in Production Engineering (COPPE/UFRJ), in Technological Innovation and Industrial Organization. Sandwich Doctorate at the Science Policy Research Unit Innovation Center at the University of Sussex, UK. BS in Economics (UFRJ). General Coordinator of the Ministry of Science and Technology Indicators between 2008 and 2009. Graduate Program in Information Science-IBICT/UFRJ coordinator (2013/2014). Researcher and leader of the research group: ECOINFO (Information, knowledge, innovation and environmental sustainability). Develops studies and research in the following areas: innovation, eco-innovations, social and environmental sustainability, Anthropocene Issues, environmental policies and information, social participation in social and environmental policies.

Wladimir Motta is Postdoctoral fellow at Latec/UFF with the project "The transition to Circular Economy and the generation of socio-environmental innovations: perspectives for Latin America", Postdoctoral fellow at IBICT with the project: "Towards Circular Economy: impasses and challenges for information and eco-innovation processes ". Graduated in Production Engineering from Universidade Federal Fluminense (2000), Master in Production Engineering from Universidade Federal Fluminense (2004) and PhD in Information Science from IBICT / Federal University of Rio de Janeiro (2016). He is currently Director of Research and Graduate Studies at CEFET/RJ, professor of the Graduate Program in Regional Development and Productive Systems - PPDSP/CEFET-RJ, adjunct professor in the Department of Production Engineering at CEFET-RJ and visiting professor at MBE COPPE / UFRJ in Environment. Member of the Special Committee for Studies in Circular Economy - ABNT/ISO TC-323. Researcher and leader of the ECCOA research group: eco-economies, eco-innovation and the life cycle approach.

Marcelo Maciel is PhD in Energy Planning by Coppe/UFRJ. Master in Business Administration (IBMEC-RJ) and specialization (MBA) in Strategic Information Management at UFRJ. Graduated in Economic Sciences from UERJ. He has provided consulting services to transnational companies in strategic planning in the oil and gas sector. He served as Commercial and Technical Manager at PDVSA, Citgo Petroleum Corporation and Chevron. He is currently an Associate Professor in the Engineering and Business Administration programs at Cefet / RJ, where he teaches the subjects of Economic Theory and Brazilian Economy. He leads the Knowledge and Innovation Management research group registered in the CNPQ group directories. He was Director of Strategic Management at Cefet-RJ, accumulating the function of President of the Technical-scientific committee of Revista Acadêmica Tecnologia & Cultura.